AMENDMENTS TO THE CLAIMS

Please amend the specification pursuant to 37 C.F.R. 1.121 as follows:

1. (Original) A method for estimating a melting temperature (T_m) for a polynucleotide at a desired ion concentration $[X^+]$, said polynucleotide having a known G-C content value, f(G-C), comprising:
   (a) obtaining a reference melting temperature (T_m^0) for the polynucleotide, said reference melting temperature being a melting temperature obtained or provided for the polynucleotide at a reference ion concentration $[X^+]_0$; and
   (b) modifying the reference melting temperature by a logarithm of the ratio of said desired ion concentration to said reference ion concentration, said logarithm being multiplied by a coefficient which is a function of the G-C content value,

wherein the estimated melting temperature is calculated using the reference melting temperature.

2. (Original) A method for estimating a melting temperature (T_m) for a polynucleotide at a desired ion concentration $[X^+]$, said polynucleotide having a known G-C content value, f(G-C), comprising:
   (a) obtaining a reference melting temperature (T_m^0) for the polynucleotide, said reference melting temperature being a melting temperature obtained or provided for the polynucleotide at a reference ion concentration $[X^+]_0$; and
   (b) modifying the reference melting temperature by an amount,

$$k\big(f(G-C)\big)\times\ln\frac{[X^+]}{[X^+]_0}$$

in which the coefficient $k(f(G\text{-}C))$ is a function of the G-C content value $f(G\text{-}C)$, wherein the estimated melting temperature is obtained by using the reference melting temperature.

3. (Original) The method of claim 2, wherein the coefficient k has a value determined by the relation

$$k\big(f(G-C)\big)=m\cdot f(G-C)+k_0 \text{ ; and}$$

wherein a first coefficient, m and a second coefficient , k_0, are optimized for predicting polynucleotide melting temperatures T_m^0.

4. (Original) The method of claim 2, wherein the reference melting temperature T_m^0 is used to calculate T_m according to the formula:

$$T_m = T_m^0 + k\times\ln\frac{[X^+]}{[X^+]_0}.$$

5. (Original) The method of claim 4, wherein the coefficient k

$$k\big(f(G-C)\big)=m\cdot f(G-C)+k_0 \text{ ;}$$

and wherein a first coefficient, m and a second coefficient , k_0, are optimized for predicting polynucleotide melting temperatures T_m^0.

6. (Currently amended) The method of claim 2, wherein the reference melting temperature T_m^0 is used to calculate T_m according to the formula:

$$T_m = T_m^0 + k\big(f(G-C)\big)\times\ln\frac{[X^+]}{[X^+]_0} + b\times\left(\ln^2[X^+]-\ln^2[X^+]_0\right)$$

wherein a coefficient b is optimized for predicting polynucleotide melting temperatures.

7. (Original) The method of claim 6, wherein k is $m \cdot f(G-C) + k_0$; and wherein a first coefficient, m, a second coefficient , k_0 and a third coefficient b are optimized for predicting polynucleotide melting temperatures T_m^0.

8. (Original) The method according to claim 5, wherein m is –3.22, k_0 is 6.39.

9. (Original) The method according to claim 7, wherein m is –4.62, k_0 is 4.52 and b = -0.985.

10. (Original) The method of claim 2, wherein the reference melting temperature T_m^0 is used to calculate T_m according to the formula:

$$\frac{1}{T_m} = \frac{1}{T_m^0} + k(f(G-C)) \times \ln\frac{[X^+]}{[X^+]_0}.$$

11. (Original) The method of claim 10, wherein the coefficient k has a determined value by the relation $kf(G-C)) = m \cdot f(G-C) + k_0$; and wherein a first coefficient, m and a second coefficient, k_0 are optimized for predicting polynucleotide melting temperatures.

12. (Currently amended) The method of claim 2, wherein the melting temperature is obtained from the reference T_m^0 by utilizing the formula:

$$\frac{1}{T_m} = \frac{1}{T_m^0} + k(f(G-C)) \times \ln\frac{[X^+]}{[X^+]_0} + b \times \left(\ln^2[X^+] - \ln^2[X^+]_0\right)$$

wherein a coefficient b is optimized for predicting polynucleotide melting temperatures.

13. (Original) The method of claim 10, wherein k is $m \cdot f(G-C)+k_0$; and wherein a first coefficient, m and a second coefficient, k_0, and a third coefficient b are optimized for predicting polynucleotide melting temperature.

14. (Original) The method of claim 11, wherein k_0 is -6.18×10^{-5}; m is 3.85×10^{-5}.

15. (Original) The method of claim 13, wherein k_0 is -3.95×10^{-5}; m is 4.29×10^{-5}; and b is 9.40×10^{-6}.

16. (Original) The method of claim 2, wherein the G-C content value is the fraction of the polynucleotide's nucleotide bases that are either guanine or cytosine.

17. (Original) The method of claim 1, wherein the polynucleotide is DNA.

18. (Original) The method of claim 1, wherein the polynucleotide ranges in length from about 2 to about 500 basepairs.

19. (Original) The method of claim 1, wherein the polynucleotide ranges in length from about 5 to about 200 base pairs.

20. (Original) The method of claim 1, wherein the polynucleotide ranges from about 10 to about 30 basepairs in length.

21. (Original) The method of claim 1, wherein the reference melting temperature is experimentally determined..

22. (Original) The method of claim 1, wherein the reference melting temperature is calculated from a theoretical model.

23. (Original) The method of claim 1, wherein the reference melting temperature is obtained by utilizing a nearest neighbor model.

24. (Original) The method of claim 1, wherein the reference ion concentration is 1 M.

25. (Original) The method of claim 1, wherein the ion is a monovalent ion.

26. (Original) The method of claim 1, wherein the ion is selected from the group consisting of the cations of sodium, lithium, potassium, rubidium, cesium and francium.

27. (Original) The method of claim 1, wherein the desired ion concentration ranges between about 1mM and about 5M.

28. (Original) The method of claim 1, wherein the desired ion concentration ranges between about 10 mM and about 2M.

29. (Original) The method of claim 1, wherein the desired ion concentration ranges between about 70 mM and about 1021mM.

30. (Original) A computer system for predicting a melting temperature, which computer system comprises:

(a) a memory; and

(b) a processor interconnected with the memory and having one or more software components loaded therein,

wherein the one or more software components cause the processor to execute steps of a method according to claim 1.

31. (Original) A computer program product comprising a computer readable medium having one or more software components encoded thereon in computer readable form, wherein the one or more software components may be loaded into a memory of a computer system and cause a processor interconnected with said memory to execute steps of a method according to claim 1.